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# ideas on innovation

VOLUME 2, ISSUE 1  
AUGUST 1985

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Government  
Publications

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"Ideas on Innovation," a periodic newsletter from IDEA Corporation, discusses some of the opportunities and questions that surround the advancement of new technologies. This issue is about scientific research, and why it is important for Canada to compete with the international science and technology communities.

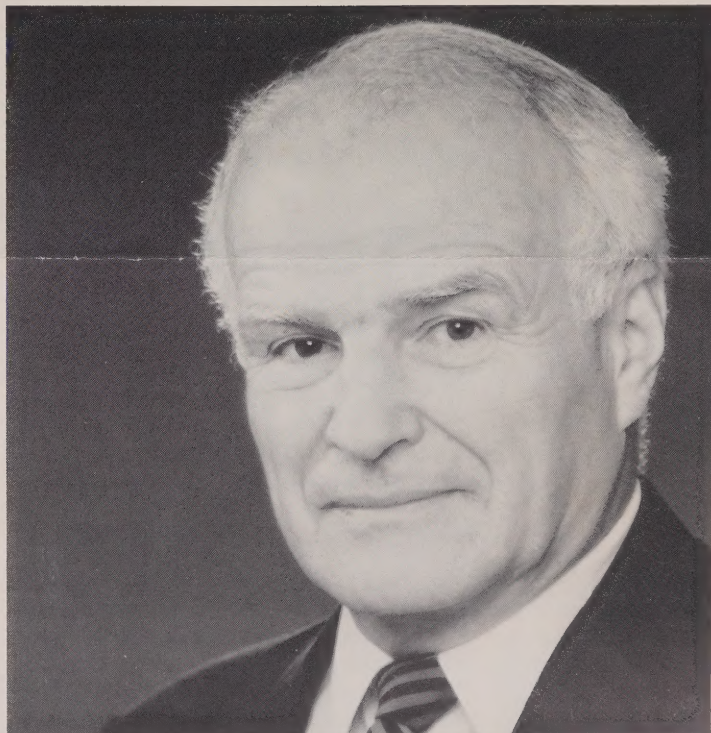
## WORLD-CLASS RESEARCH—

why Canada needs more of it

Canada's economy is facing a new competitive challenge that it cannot ignore.

"With the current explosion of new knowledge and rapid technological change," says Dr. J. Fraser Mustard, president of The Canadian Institute for Advanced Research (CIAR), "we have an opportunity to develop and market some of the best scientific advances in the world and keep control over our economic base. No longer must Canadians depend on traditional industries, like natural resources, for economic prosperity and job creation. Now we can set our sights on developing new industries that will emerge from an explosion of new Canadian technologies."

Throughout the world, markets for high-quality products at the cutting edge of modern technology are surpassing even the most optimistic predictions. Typically, the research that precludes these products places a heavy demand on both human and financial resources—from highly skilled researchers to sophisticated equipment and information retrieval systems. To be truly competitive in the technology marketplace requires a substantial investment in research and development.

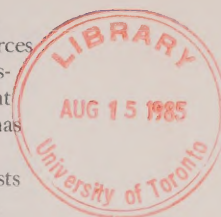


Dr. J. Fraser Mustard,  
President, Canadian  
Institute for Advanced  
Research

## LEARNING TO CONCENTRATE—

talent and money

Concern over dilution of Canadian research talent and financial resources is not new says Dr. Mustard. "Historically, the national predicament in developing new Canadian technologies has been simply this: our research community consists of a handful of underfunded scientists in institutions scattered across an enormous geographical area. And the dispersion of our research talent is further aggravated by a brain drain to the much larger, active and well-funded U.S. research community."



***"We can set our sights on new industries emerging from an explosion of new Canadian technologies."***

*Dr. J. Fraser Mustard, President, Canadian Institute for Advanced Research*

Dr. Mustard and his colleagues at CIAR have a crystalline goal: to help Canada retain its best scientific minds and keep them working on developments that will contribute to long-term economic and social well-being.

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## **ONE APPROACH— networking for scientists**

**T**he Institute has developed an innovative approach that concentrates high-powered research talent. It constructs networks of outstanding researchers, from several disciplines, who are based at universities in various parts of the country. The researchers are linked through regular working sessions and sophisticated communications systems that create a strong, dynamic research environment.

Instead of competing with one another, the scientists work as colleagues, sharing their expertise and the unique insights proffered by their distinct disciplines.

Early signs of the Institute's success at creating an alliance of top-notch Canadian research talent can be seen in its first project: a five-year, \$10-million exploration of Artificial Intelligence or AI. The Institute has selected a dozen of the country's most talented researchers from computer science, psychology, engineering and neurobiology to investigate the scientific problems involved in developing robots that can sense, think and act independently.

The researchers are located at the University of British Columbia, University of Toronto and McGill University, and are linked by an electronic communications network that allows the individuals to collaborate on their research.

The Institute provides fellowships to the researchers, freeing them from their teaching obligations. Adequate funding, increased research time and the opportunity to work with their peers from other disciplines make the network particularly attractive to these scientists. Already, several of them have been able to resist the pull that has, in the past, siphoned off Canadian research talent to

the United States. And in one case, a young Canadian computer scientist has been recruited back to Canada from Silicon Valley to join the AI team.

Canada is not alone in experimenting with a networking approach to carrying out complex research projects. Similar arrangements are being tested throughout the world, and a comparable program recently was announced in the U.S. where eight universities and three U.S. Air Force organizations have joined forces in an \$8.2 million (U.S.) study of Artificial Intelligence.

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## **UNIVERSITIES AND INDUSTRY— why they need each other**

**C**CIAR's efforts to boost the quality and intensity of Canadian university research are positive steps toward creating a more competitive scientific community.

The next challenge Canada faces is how to improve the sluggish rate at which technological developments move from laboratory to marketplace. Assuming Canadian research can compete at an international level, greater thought and action is needed by both the university and business communities to put these technological innovations to work.

To this end, IDEA Corporation has started a financing program that helps Ontario universities hire the staff necessary for identifying and moving commercially viable technological innovations out of their laboratories. And last month, IDEA established two experimental seed capital funds with the University of Toronto's Innovations Foundation and York University. These new funds will provide financing in the next year to help develop business information—such as patents, copyrights, marketing studies and business plans—for some of the universities' research projects.

Dr. Peter Morand, Director of Research Services at the University of Ottawa, points

***"If Canadian industry put more university research to work, everyone would reap the benefits."***

*Dr. Peter Morand, Director, Research Services, University of Ottawa*

out that the federal and provincial governments (and the universities) have been warning for the past decade that industry and the corporate world must get involved more directly and more often in basic university research. "I know that there is world-class basic research being done in several Canadian universities," he says. "But corporations and industries are so very slow to act."

In other parts of the world, universities are assuming more and more responsibility for their nations' research efforts, and industry is seeking closer and more formal links with university research centers for their supply of new technological products and processes.

Nowhere is this tendency more apparent than in California's Silicon Valley, Boston's Route 128, and other U.S. centers where meccas for technology-based start-up companies have developed around leading research universities.

"When I look around the University of Ottawa," says Dr. Morand, "where Quaker Oats, Bell Northern Research and Allied Canada Inc. are among prominent corporate names supporting basic research, I see some evidence of progress. But much of Canadian industry needs to wake up: a great deal of the basic research it needs may already be under way in the universities. It's up to them to find out where it is and help to support the efforts that, in time, may reap them a profit. The universities would delight in knowing someone is out there looking for them. And both universities and industry would benefit from the experience of working together."

## **OH, CANADA— letting technology pass us by**

**P**eter Munsche, executive director of CIAR agrees that Canadian industry has much to gain by investing in university research. "If Canadian industry has to depend on out-of-date technology, or does not possess a knowledge base that allows it to adapt new technologies, our key industries are going to be in trouble," he



*Peter Munsche,  
Executive Director,  
Canadian Institute for  
Advanced Research*

says. "Surely Canadian companies have many good reasons for investing in scientific research: they will be more competitive; productivity will go up; resources will be used more efficiently; and our best minds will stay in Canada."

By neglecting the development of new Canadian technologies a domino effect will be created in the economy, he says. "I think what we'll lose first is our brightest young people who will be drawn to more vibrant, active research environments. Our industries and their products will become less and less competitive, and Canada no longer will offer a sufficient share of attractive investment opportunities to interest foreign or domestic investors."

The competitiveness of Canadian industries is critically important to national well-being. "Investing more in science and technology won't cure all our economic ills," says Fraser Mustard, "but it will allow us to compete better in the future. We don't have a choice—we have to compete. Besides, it's fun to win once in a while." ▼

## WHAT WILL THE JOBS BE?

**T**o keep pace with rapid technological change, we need trained people for emerging occupations. But will the trained people be available? Will our educational institutions respond quickly enough to meet the needs of industry? And what will those needs be?

Improved communication between business and academia is essential if we expect an appropriate response to changes in the labor market's demand for technological skills. To be effective, this communication must be based on solid information that allows employers to signal the educational institutions when their occupational needs change.

Ford Motor Company of Canada, Honeywell Limited and Development Consulting Limited have joined IDEA Corporation to provide just such an information base.

As charter members of the Technology Skills Syndicate, these organizations are the driving force behind the introduction of an ongoing supply and demand assessment of technology skills in Ontario.

The assessment will:

- provide demand and supply trend information;
- identify emerging or changing technologies that will require new training or education;
- present informed opinion on current situations where graduate training and preparation does not match employer needs;
- examine specific situations in different industries.

The Syndicate also will include advisers representing Ontario's college and university systems.



The first report of the Syndicate will be based on a representative survey of Ontario firms that employ scientists, engineers and technologists. The results of this demand-side survey will be available to the public in the fall of 1985 at a planned publication price of \$25.00. The second report, an analysis of enrolments and graduations in science, engineering and technology fields, will be issued in the spring of 1986.

For further information on the Syndicate and these reports, please contact: Ross Perry, IDEA Corporation, 33 Yonge Street, Suite 800, Toronto, Ontario M5E 1V3 (416) 362-4400.



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